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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/748,256	12/27/2000	Howard H. Chen	YO999-153DIV	4783

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EXAMINER
NADAV, ORI

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 04/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/748,256	Applicant(s) CHEN ET AL.	
	Examiner ori nadav	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-39 and 41-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-39 and 41-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 29, 34, 41, 42 and 45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanigawa (5,740,099).

Tanigawa teaches in figure 6 and related text a hybrid semiconductor device comprising a bulk silicon region comprising single crystal silicon (column 8, line 21), and an SOI region comprising an insulator layer 30c formed beneath an upper portion of the single crystal silicon 30d and has at least one lateral end portion adjacent to a lower portion of the single crystal silicon, and at least two isolation oxides 34 formed in an upper portion of the single crystal silicon so as to form a plurality of islands of the single crystal silicon on an upper surface of the insulator layer, wherein a memory device is positioned in the bulk silicon region.

3. Claims 29, 34, 35, 41, 42 and 45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Okonogi (5,529,947).

Okonogi teaches in figure 2L and related text a hybrid semiconductor device comprising a bulk silicon region comprising single crystal silicon (column 4, line 4), and an SOI region comprising an insulator layer 14 formed beneath an upper portion of the single crystal silicon 11a and has at least one lateral end portion adjacent to a lower portion of the single crystal silicon, and at least two isolation oxides 17 formed in an upper portion of the single crystal silicon so as to form at least one island of the single crystal silicon on an upper surface of the insulator layer, wherein a logic device is positioned in the bulk silicon region.

Regarding claim 35, Okonogi teaches in figure 2L planarizing the upper surface of the isolation oxides 17 and the single crystal silicon 11a.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 30-33, 36-39, 43-44 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanigawa.

Regarding claims 37-39 and 43-44, Tanigawa teach in figure 6 substantially the entire claimed structure, as applied to claims 29, 34, 41, 42 and 45-46 above, including forming a DRAM memory device on the silicon bulk, but except forming a logic device on the SOI region.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to a logic device on the SOI region of Tanigawa's device in order to use the device in an particular application which requires memory and logic circuits.

Regarding the processing limitations of forming a crystallized silicon layer by depositing and annealing the amorphous silicon, and horizontally growing the single crystal silicon having the same crystal orientation as the insulator layer by using the lower portion of the silicon as a seed, using isolation oxides to remove defects on the SOI region and forming isolation oxides by forming trenches and depositing oxide in the trenches, as recited in claims 32, 33, 36, 47, 48 and 30, 49, these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it

is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claim 31, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an insulator having a thickness in the range of 1000A to 5000A in Tanigawa's device since it is within the skills of an artisan, subject to routine experimentation and optimization, to form an insulator having a thickness in the range of 1000A to 5000A.

6. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanigawa in view of Okonogi (5,529,947).

Tanigawa teaches in figure 6 substantially the entire claimed structure, as applied to claim 29 above, except planarizing the upper surface of the isolation oxides and the single crystal silicon.

Okonogi teaches in figure 2L planarizing the upper surface of the isolation oxides 17 and the single crystal silicon 11a. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use planarized isolation oxides and

single crystal silicon in Tanigawa's device in order to simplify the processing steps of making the device, and providing better island isolation via trench isolation.

7. Claims 30-33, 36-39, 43-44 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okonogi.

Regarding claims 37-39 and 43-44, Okonogi teach in figure 2L substantially the entire claimed structure, as applied to claims 29, 34, 35, 41, 42 and 45-46 above, including forming a logic device on the silicon bulk, but except forming a memory device on the SOI region.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to a memory device on the SOI region of Tanigawa's device in order to use the device in an particular application which requires memory and logic circuits.

Regarding the processing limitations of forming a crystalized silicon layer by depositing and annealing the amorphous silicon, and horizontally growing the single crystal silicon having the same cystal orientation as the insulator layer by using the lower portion of the silicon as a seed, using isolation oxides to remove defects on the SOI region and forming isolation oxides by forming shallow trenches and depositing oxide in the shallow trenches, as recited in claims 32, 33, 36, 47, 48 and 30, 49, these would not

carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claim 31, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an insulator having a thickness in the range of 1000A to 5000A in Okonogi's device since it is within the skills of an artisan, subject to routine experimentation and optimization, to form an insulator having a thickness in the range of 1000A to 5000A.

Response to Arguments

8. Applicant's arguments with respect to claims 29-39 and 41-45 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References C-I are cited as being related to SOI and bulk films.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related t Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772.**

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

Ori Nadav

April 17, 2002

Steven Loke
Primary Examiner